

REMARKS

The Final Office Action of April 16, 2008, has been carefully considered. Claims 1-12, 14, 17-24 were pending at the time of the Office Action. Claims 1 - 12 and 14 have been amended. Claims 1-12, 14, 17-24 are now pending. In view of the following remarks, Applicant respectfully requests reconsideration and allowance of the subject application. The amendments to claims 1 - 12 and 14 are made simply to provide clarification and/or to correct informalities noted by the Applicant, and are not to overcome prior art or any other objections. Each of the objections and rejections in the Office Action are addressed in the following remarks.

Applicant's amendments and remarks after Final are appropriate under 37 C.F.R. §1.116 because they address the Office's remarks in the Final Action, and thus could not have been presented earlier. In addition, Applicant respectfully requests that the amendments and remarks be entered to place the application in condition for allowance or in better form for appeal.

Statement of Substance of Interview

An interview was conducted between, the undersigned representative for the Applicant and the Examiner on August 14, 2008. Applicant greatly appreciates the Examiner's willingness to talk. Such willingness is invaluable to our common goal of an expedited prosecution of this patent application.

During the interview, it was discussed how the claims differed from the cited references, namely claims 1 and 12, and the Agesen reference (U.S. Patent No. 6,529,919). Without conceding the propriety of the rejections and in the interest of expediting prosecution, several possible clarifying amendments were proposed.

The Examiner was receptive to the proposals, specifically the clarification regarding the Agesen reference failing to disclose identifying objects that have been accessed since a last garbage collection. However, the Examiner indicated that she/he would need to review the cited art more carefully and/or do another search, and requested that the proposed amendments be presented in writing.

Applicant herein amends the claims in the manner discussed during the interview. Accordingly, Applicant submits that the pending claims are allowable over the cited art of record for at least the reasons discussed during the interview.

§ 101 REJECTIONS

Claims 1-11 stand rejected under 35 U.S.C. § 101 as being directed to non-statutory subject matter. Specifically claims 1-11 were rejected as reciting “computer readable medium” which the examiner submits as not being limited to tangible embodiments. Applicant respectfully traverses the rejection.

Applicant has amended claims 1-11 to recite a “computer readable storage medium.” Applicant submits that the addition of “storage” limits the claims to a tangible embodiment thus rendering the claims statutory. Accordingly, claims 1-11 are allowable.

§ 103 REJECTIONS

Claims 1-12, 14, 17-24 stand rejected under 35 U.S.C. § 103(a) as being obvious over U.S. Patent No. 6,308,185 (hereinafter “Grarup”) in view of U.S. Patent No. 6,529,919 (hereinafter “Agesen”).

For the reasons set forth below, the Examiner has not shown that the cited reference anticipates the rejected claims. Accordingly, Applicant respectfully traverses this rejection, and further requests that the §103 rejection be withdrawn and the case be passed along to issuance.

Lack of Prima Facie Case of Obviousness (MPEP § 2142)

Applicant disagrees with the Examiner's obviousness rejections. Arguments presented herein point to various aspects of the record to demonstrate that all of the criteria set forth for making a prima facie case have not been met.

Amended Independent Claim 1

Applicant submits that the combination of Grarup and Agesen does not render this claim obvious because neither reference discloses the following elements as recited in claim 1 (with emphasis added):

- “requesting a list from a tracking mechanism, the list identifying a plurality of memory locations *that have been accessed* since a last ephemeral garbage collection, each memory location corresponding to one of a plurality of cards associated with a card table, wherein the card table identifies one or more of the plurality of cards with one or more objects that have been accessed, each of the plurality of cards being associated with the one or more objects allocated from within a memory heap;”
- “marking two or more of the plurality of bundles identified in the bundle table using the list, *wherein the marked bundles identify groupings of subsets of the plurality of marked cards having associated*

objects that have been accessed since the last garbage collection process”

Amended Independent Claim 12

Applicant submits that the combination of Grarup and Agesen does not render this claim obvious because neither reference discloses the following elements as recited in amended claim 12 (with emphasis added):

- “creating one or more bundle tables containing entries identifying groupings of the cards in the plurality of bundles, *for each stored statement within the program*, storing a value at a memory location within the heap memory based on the stored statement, marking one of the plurality of cards within the card table memory based on the memory location, and tracking access to the card table memory;
- updating at least one bundle table by marking the entries in the bundle table *based on information obtained from the write-watch list*, wherein the updated marked bundle table identifies groupings *the plurality of corresponds to marked cards having associated objects that have been accessed since a last garbage collection process;*”

Independent Claim 19

Applicant submits that the combination of Grarup and Agesen does not render this claim obvious because neither reference discloses the following elements as recited in claim 19 (with emphasis added):

- “request a list from a tracking mechanism, the *list only identifying memory locations that have been written into* since a last garbage

collection cycle, each memory location corresponding to one of the plurality of cards associated with a card table, wherein the card table identifies one or more cards that have been accessed;”

- “updating at least one bundle table by marking bundles within the bundle table based *on the list*, wherein the marked bundles corresponds to marked cards having associated objects that have been accessed since a last garbage collection process;”

In the April 16, 2008 office action, the office indicated that Grarup does not disclose the following elements of claim 1:

“requesting a list from a tracking mechanism, the list identifying a plurality of memory locations that have been accessed since the last ephemeral garbage collection; creating a bundle table identifying a plurality of bundles; updating bundles by marking two or more of the plurality of bundles in the table using the list, wherein the updated marked bundle corresponds to marked cards in the marked bundle having associated objects that have been accessed since a last garbage collection process; for each marked bundle within the bundle table, determining at least one marked card within the marked bundle table.”

(Office action, p. 4)

The office indicated that Grarup does not disclose the following elements of claim 12:

“the write match mechanism maintains a write-watch list that identifies cards accessed within the card table memory since a garbage collection was last performed; creating one or more bundle tables identifying groupings of the cards in the plurality of bundles; updating at least one bundle table by marking the bundle table based on information obtained from the write-watch list, wherein the updated marked bundle table corresponds to marked cards having associated objects that have been accessed since a last garbage

collection process; for each marked bundle table, determining at least one marked card within the marked bundle table.” (Office action, p. 9).

The office indicated that Grarup does not disclose the following elements of claim 19:

“requesting a list from a tracking mechanism, the list only identifying a plurality of memory locations that have been written to since the last garbage collection cycle; creating one or more bundle tables wherein each bundle table identifies groupings of the plurality of cards in the plurality of bundles; updating at least one bundle table by marking bundles within the bundle table based on the list, wherein the marked bundles corresponds to marked cards having associated objects that have been accessed since a last garbage collection process; determining, for each marked bundle, at least one marked card within the marked bundle, the at least one marked card indicating that one or more objects associated with the marked card have been accessed.” (Office action, p. 12)

Agesen was cited for its alleged teaching of the missing claim elements of claims 1, 12 and 19 (See Office action pages 5–6, 9-10 and 13).

However, Agesen fails to remedy the deficiencies in Grarup noted above with respect to claims 1, 12 and 19. For example, Agesen fails to disclose or suggest “requesting a list from a tracking mechanism” and “marking two or more of the plurality of bundles in the table using the list” as presently recited in amended claim 1, and fails to disclose or suggest “maintains a write-watch list that identifies cards accessed within the card table memory” and “updating at least one bundle table by marking the entries in the bundle table based on information obtained from the write-watch list” as recited in amended claim 12. Further, Agesen fails to disclose or suggest, “request a list from a tracking mechanism and

“updating at least one bundle table by marking bundles within the bundle table based on the list, wherein the marked bundles corresponds to marked cards having associated objects that have been accessed since a last garbage collection process” as recited in claim 19.

Agesen fails to remedy the deficiency of Grarup by including using a list or identify memory locations as recited in claims 1, 12 and 19. Assuming, as the office submits, that a “class remembered set” is analogous to a “list,” Agesen does not update bundles using the “class remembered set.” In addition, Agesen does not “identify memory locations that have been accessed since the last ephemeral garbage collection.” (emphasis added) Rather Agesen uses a list to identify memory locations that have been allocated. Applicant submits that this reasoning is improper because allocating a memory location is not the same as accessing a memory location.

No Reason to Combine References

The Examiner reasons that the two references should be combined stating “that it would have been obvious to one of ordinary skill in the art to implement Agesen’s garbage collector within Grarup’s generational garbage collection process because all the claimed elements were known in the prior art and one skilled in the art could have combined the elements as claimed by known methods with no change in their respective functions, and the combination would have yielded the predictable results of enabling a garbage collection process to reclaim objects whose reclamation would otherwise impose unacceptable delays as taught

by Agesen.” (Office Action, pages 5-6, 10 and 13-14) Applicant submits that this reasoning is improper.

In formulating this reasoning, the Examiner has overlooked the fact that Grarup system already incorporates a “method for facilitating old generation garbage collection.” Applicant submits that one of ordinary skill in the art would not look to another reference for a solution already provided by Grarup.

In addition, Applicant submits that the Examiner has used hindsight reasoning for the combination of references using the claims of the instant application as his guide. The asserted advantage of “reclaiming objects” is formulated without the use of the references themselves or reasoning one of ordinary skill in the art.

Indeed, the stated reasoning appears to ignore the clear teaching of Agesen which states that garbage collection identifies objects directly allocated (referring to their system of allocating an object’s location) (col. 16, lines 1-8). Applicant submits that one of ordinary skill in the art at the time the invention was made would not reason that Agesen teaches a system for indicating objects that have been accessed in memory since a last collection process.

Further, the Examiner has not shown how incorporating Grarup into Agesen has advantaged Agesen according to the asserted reason. Since Grarup already discloses the technique for managing memory, how is the memory allocation of Agesen of indicating objects that have been allocated an advantage?

The Applicant submits that it is not. Accordingly, amended claims 1 and 12, and claim 19 are allowable over the combination of Agesen and Grarup.

No Reasonable Expectation of Success

Finally, Applicant submits that one of ordinary skill in the art would not have combined the teachings of these references because there is no reasonable expectation of success. Grarup discloses a system for performing generational garbage collection within computer memory," (Grarup, Abstract). Agesen's system is for "identifying all objects directly allocated in the train-managed generation...", (Agesen, 16: 1-2).

Applicant submits that one of ordinary skill in the art would have no reasonable expectation of success by combining the system of Agesen, with the system of Grarup.

In sum, Applicant submits that there is no suggestion, teaching, or reason given by one reference that would give one of ordinary skill in the art reason to combine Grarup with the teachings of Agesen. Accordingly, Applicant asks the Examiner to withdraw the rejection of these claims.

Thus, Grarup and Agesen, whether taken alone or in combination (even assuming for the sake of argument that they can be combined), fail to disclose or suggest the features of claims 1, 12 and 19. Accordingly, independent claims 1, 12 and 19 are allowable.

Claims 2-11, 14, 17-18, and 20-24 ultimately depend upon independent claims 1, 12, and 19. As discussed above, claims 1, 12, and 19 are allowable. It is

axiomatic that any dependent claim which depends from an allowable base claim is also allowable. Accordingly, the §103 rejection should be withdrawn.

CONCLUSION

By the foregoing remarks, Applicant believes that all pending Claims 1-12, 14, 17-24 are allowable and the application is in condition for allowance. Therefore, a Notice of Allowance is respectfully requested.

The arguments and amendments presented herein were necessitated by the most recent Office Action, and could not have been presented previously because the final Office Action rejected claims based on new art not previously of record.

Should the Examiner have any further issues regarding this application, the Examiner is requested to contact the undersigned attorney for the Applicant at the telephone number provided below.

Respectfully Submitted,

Dated: 2/25/08

By: 

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